The Town of Paradise

Capital Projects Services

Design Standards

I have read and understand the conditions contained within this document and agree to fully comply with these standards.

_____

Signature   Date

Capital Project Design Standards

Purpose
The purpose of this document is to assist in the adoption of drafting and design techniques to standardize the creation of improvement plans. This document is to be used as a set of guidelines, to be implemented when possible. Most of the settings contained within these standards will be implemented by using the Town of Paradise Civil 3D prototype drawing, which contains the object styles required. It should be understood there will be situations in which some of these guidelines will not be possible, or where they do not address the current situation. In cases such as this, it is expected of the designer or drafter to use sound judgment in the organization of their drawings.

When drawings coming in from all consultants are using the same drafting standards, it makes it much easier and faster for Town personnel to plot, check, and revise plans for Town projects. Standards will also greatly assist in adding improvements to the Town's GIS files.

Required Use of Standards
Use of this set of standards is required for use on:
- All projects, including mapping, that are Town funded.
- All projects which will be turned over to the Town for adoption or maintenance

Submittals
All drawings shall be designed and submitted to the Town in AutoCAD Civil 3D format and shall be in the latest or second to the latest version of the software. Drawings shall be Color Dependent Plot Style (CTB), Not Named Plot Style (STB). All design components shall utilize Civil 3D objects such as alignments, corridors, profiles, surfaces, points, pipeworks, and sheet layout.

Non-standard fonts, linetypes, attached images, and externally referenced files shall be included with each submittal.

Drawings and all project files shall be submitted on a CD, memory stick, or fileshare software accompanied by a transmittal sheet with full description of the submittal. A multiple page single PDF file of the final plans and one full size 24"x36" plotted set of plans shall also accompany the submittal.

Drawing names
Drawing names shall begin with the Town of Paradise 4-digit project number followed by "B" for the Base Drawing and "T" for the Topo Drawing. As an example, the main design drawing for the third phase of a particular Capital Project should be "XXXXB PhIII.dwg".

Drawing Orientation and Configuration
All design work shall be based on a singular model and all design sheets shall be contained in a single drawing file. Model viewports shall be utilized to display portions of the project and sheets shall be placed on their individual paperspace tabs contained in the single base drawing. Paperspace tab names shall remain short, but descriptive.

True North shall face directly up in modelspace when in the world coordinate system. Roadway centerline alignments shall be oriented horizontally and be increasing in station from left to right. Match lines shall be used when multiple sheets are required. The North arrow shall be oriented toward the top of the sheet whenever feasible. Translation and rotation settings in design software shall NOT be used.

Datum and Basis of Bearings
All project plans shall be based on Town of Paradise datum and shall have horizontal control which complies with the Town of Paradise Survey Standards, latest edition.
Control points shall be clearly visible on the drawings and in the field for easy correlation. Basis of bearings and locations of Town benchmarks shall be noted on drawing or title sheet.

Topographic Survey Points
All topographic surveys shall fully comply with the Town of Paradise Capital Project Services Survey Requirements, latest revision.

Text
Design labels, notes, and stationing text size shall be 0.08" high, be simplex font, and be a Civil 3D label type instead of an Autocad "mtext" or "dtext" object whenever possible. Other callouts such as street names, matchline labels, and titles can be larger and of different font if preferred, but any non-standard fonts must accompany the submittal. These types of labels may be Autocad "mtext" or "dtext". The width factor on all text shall be 1.0. All general notes and callouts on all sheets shall be the same font style and height of Simplex, 0.08".

Dimensions
Dimensions shall be associative whenever possible. Dimension text and arrowhead size shall be 0.08 and shall be closed filled style. Dimensions shall be in decimal feet, not in feet and inches. Unnecessary or redundant dimensions should be avoided.

Alignments
Alignments should begin 50' before the actual start of the centerline and end 50' after the actual end of the centerline. Centerline intersections of roadways shall start at an even station such as 1+00, unless you are matching a pre-existing stationing, or directed to do so by the Town.

Alignments shall have lines that are tangent to curves and the radii of curves shall be to an even value, whenever practical.

Stationing
Stationing shall be labeled using the text style and size specified above and should be oriented from left to right in increasing station. North arrows shall face up or to the left on the plan and profile sheets, whenever practical.

Contours
Contours shall be derived from the Civil 3D surface object set to the CPS style for 1' and 5' contours. In extremely flat areas, contour intervals may be reduced to 0.5' to 2.5'.

Labeling
All labels for pipes, alignments, profiles, contours, utilities, etc., shall be in modelspace only using Civil 3D (C3D) labels. Street names and matchlines may be in paperspace if desired.

Xrefs
External References should be used on a minimal basis whenever possible. On larger projects, drawings may be separated by topographic mapping (T drawing) and the Design Base (B drawing). Other drawings such as pipeworks drawings that include all existing and proposed pipes may be broken out and Xreffed into the design drawing. The drawing organization shall comply with the applicable section of this document.

Scale
All drawings shall be designed using a 1"=20' scale, unless prior written approval from the Town has been obtained. Profile vertical scales shall be an even multiple of the horizontal scale, such as 1" = 2',4',5',or 10', depending on the vertical differences in elevation of the topo. Details do not need to be drawn to scale, but then must be labeled "Not To Scale".

Borders
Sheet borders shall be the Town of Paradise standard 22"x34" border inserted in paper space at a scale of 1.0, and shall include the project name, project number, and all other pertinent information for the project. The title sheet shall have the Project name, project number, vicinity map, location map, abbreviations, legend, applicable standard plans, and engineer's stamp. Standard Town sheet borders will be made available to the consultants in AutoCAD format. The standard Town sheet borders are blocks and should <u>never</u> be exploded.

Blocks
Blocks shall be used for common symbols like drain inlets, fire hydrants, manholes, etc., whenever possible to minimize

drawing size.Linetypes

Linetypes and lineweights, along with shading, can be used to differentiate between existing features and proposed features. Complexed or nonstandard linetypes may be used, but the line file must accompany the submittal. **Segmented lines for fences, etc. shall not be used at any time.**

Hatch Patterns

Hatched areas shall be maintained as hatches and not exploded into individual entities. Hatches that have been exploded create drawings that are much larger in size than they need to be. Hatches shall be associative whenever feasible.

Layers

The layer names and uses specified here will be those layers created by the drafter, not those created Automatically by Autodesk Civil 3D.

As these are public documents, layer names with profanity in them will not be tolerated.
The layer names shown are to be used as guidelines only. Many times there will be the need for a layer name, which is not shown here, and must be created special. In those cases, create the layer name as necessary, using a name, which is both concise, and descriptive.

Layer names are organized in their areas of use, such as Street, Site, Grading, Storm drain, Sewer, Water, Utility, Topography, and Miscellaneous.

If a pen width is specified as the color, any solid color with that pen weight can be used.

If a specific color is specified, but a different color is required for visual clarity, select another color with the same color shading and line width characteristics.

Refer to the section entitled "Colors" of this document for more information regarding color settings.

Existing features layer names

For layer names in which existing features reside on, and which do not have an "existing" layer name specified, simply add an "EX-" to the layer names shown. Shade back these layers to a shade of 40% to 50%. Any of the 40, 50, 140, or 150 series colors will work for this. Refer to the color chart in this document.

Civil 3D objects layer settings will be controlled within the style. The settings shown below are for basic autocad entities, such as 2D linework only.

Roadway

Layer Name	Description	Color	Linetype
<>-lbl	Station, offset, and grade labels with alignment name in brackets. First Sheet in alignment 'A' to be "A1-lbl"	0.25	Continuous
<>-Sitelbl	Street Improvement Labels with Alignment name in brackets. First Sheet in alignment 'A' to be "A1-sitelbl"	0.25	Continuous
Acshade(*)	Shade Hatching for Asphalt Pavement	254	Continuous
CL	Centerline of roadway	1	Center2
CL-lbl	Centerline Labels	2	Continuous
FFC-lbl	Front Face of Curb Labels	2	Continuous
GB	Grade Break	42	Dashed2
Matchline	Matchline and text	30	Continuous
Pplotnums-<>	Plan and profile lot numbers (sheet number in brackets)	105	Continuous
R-BC	Back of Curb on vertical and rolled curb	4	Continuous
R-EP	Edge of Pavement of Roadway	100	Continuous
R-FL	Flow line on rolled curb only	1	Divide2
R-LIP	Lip of Curb	3	Continuous
R-SW	Sidewalk, HC Ramps, and Driveway Aprons	4	Continuous
R-TC	Top of Curb on Vertical Curb only	1	Continuous
R-VG	Valley Gutter (flow line will be on R-FL layer)	2	Continuous

St-lt	Streetlight	2	Continuous
Stripe	Striping and Lettering	252	Continuous

Site Plan

Layer Name	Description	Color	Linetype
<>-lbl	Site Improvement Labels with sheet name in brackets. First Sheet in Site Plan to be "S1-lbl", etc.	0.25	Continuous
AcShade (*)	Shade Hatching for Asphalt Pavement	254	Continuous
R-BC	Back of Curb on vertical and rolled curb	4	Continuous
R-FL	Flowline on rolled curb only	1	Divide2
R-LIP	Lip of Curb	3	Continuous
R-Stripe	Striping, Parking, and Lettering	252	Continuous
R-SW	Sidewalk, HC Ramps, and Driveway Aprons	4	Continuous
R-TC	Top of Curb on Vertical Curb only	1	Continuous
R-VG	Valley Gutter (flow line will be on FL layer)	2	Continuous

Grading Plan

Layer Name	Description	Color	Linetype
Catch	Cut and Fill slope Catch line	101	Hidden2
FG-LBL	Grade labels	0.25	Continuous
Slope	Slope marks	63	Continuous

Storm Drain

Layer Name	Description	Color	Linetype
D	Storm Drain Surface Features, MH, CB, DI, etc	0.25	Continuous
D-FL	Storm Drain Ditch Flow line	1	FL2
D-lbl	Storm Drain Labels (Mainly on Site Plans)	0.25	Continuous
D-U	Storm Drain Subsurface features, Pipes, etc.	0.25	Continuous

Sanitary Sewer

Layer Name	Description	Color	Linetype
S	Sewer Surface Features, MH, CO, etc,	0.25	Continuous
S-LBL	Sewer Labels (Mainly on Site Plans)	0.25	Continuous
S-LAT	Sewer Laterals	204	Continuous
S-U	Sewer Subsurface Features, Pipes, Laterals, etc.	0.25	Continuous

Water

Layer Name	Description	Color	Linetype
W	Water Surface Features, Fire Hydrant, Blow-offs, etc.	0.25	Continuous
W-lbl	Water Labels (Mainly on Site Plans)	0.25	Continuous
W-U	Water Subsurface Features, Pipes, Services, etc.	0.25	Continuous

Joint Trench Utilities

Layer Name	Description	Color	Linetype
E	Electric Surface Features	0.25	Continuous
E-U	Electric Subsurface Features	0.25	Continuous
G	Gas Surface Features	0.25	Continuous
G-U	Gas Subsurface Features	0.25	Continuous
ST-LT	Light Standard	2	Continuous
T	Telephone Surface Features	0.25	Continuous
T-U	Telephone Subsurface Features	0.25	Continuous

Topography

Layer Name	Description	Color	Linetype
Ex-bldg	Existing Building	162	Hidden2
Ex-Conc	Existing Concrete	154	Hidden2
Ex-D	Existing Storm Drain Features	72	Hidden2
Ex-E	Existing Electrical Vault, Transformer, Pull Box, etc.	53	Dashed2
Ex-ep	Existing EP	153	Dashed2
Ex-fnc	Existing Fence	62	Barbwire_1
Ex-G	Existing Gas	157	Hidden2
Ex-Notes	Notes for existing features	1	Continuous
Ex-R	Existing dirt Roadway	157	Hidden2
Ex-S	Existing Sewer	71	Hidden2
Ex-T	Existing Telephone	157	Hidden2
Ex-W	Existing Water	157	Dashed2
Ex-OHE	Existing Overhead Electric	57	Hidden2
Spotel	Existing Spot Elevation	62	Continuous
Ex-Tree	Existing Trees	51	Continuous
Ex-Veg	Existing Bushes and other vegetation	51	Continuous
Ex-Toe	Existing Toe of Slope (no plot)	162	Phantom2
Ex-Top	Existing Top of Slope (no plot)	162	Phantom2

Miscellaneous

Layer Name	Description	Color	Linetype
Hatch-<>	Hatch Layer with feature in brackets	142	Continuous
Hatch-Bndy	Hatch Boundary	7	Continuous
Bndy	Boundary Line	6	Border2
Bldg	Building	83	Continuous
Control	Survey Control	2	Continuous
Demo	Demolition Layer	8	Continuous
Ease	Easement Line	1	Hidden2
Mon	Survey Monuments	9	Continuous
NoPlot	No plot layer for personal notes, etc.	8	Continuous
PL	Property Line	3	Phantom2
Points	Misc Survey Points with no description key	9	Continuous
Row	Right-of-Way Line	5	Border2
Sheet	Paperspace Sheet block layer	6	Continuous
Stk-<>	Survey Point Stakeout with feature in brackets.	0.25	Continuous
Retwall	Retaining Wall	20	Continuous
St-name	Street Names	104	Continuous
Util	General Utilities	81	Continuous
Vic	Vicinity Map	61	Continuous
Vport	Viewport Layer (No Plot)	8	Continuous

(*)   Use Solid Shading, then use DrawOrder command to send to Back.

A drawing template file which includes all of the layer names shown above, with color and linetype settings can be obtained from the Town upon request.

Colors

The drafting colors are organized by their Autocad Color number. Autocad colors range from color number 1 to 255, plus Bylayer and ByBlock.

All entity *(line, arc, circle, text, etc)* colors should be set to Bylayer, so that they take on the color characteristics of the layer they reside on. *In extreme cases only, entities may need to have a specified color associated with them.*

Referring to the color chart on the next page, the colors are laid out according to their color number. The numbers running horizontally through the full color palette represent the 10 digit and 100 digit portions of the color number, whereas the numbers running vertically on the left side of the full color palette represent the single digit portion of the color number. Using this method, the color 67 is that color square which is intersected by column "60" and row "7" of the full color palette.

The Standard colors are the first 9 colors shown as Red, Yellow, Green, Cyan, Blue, Magenta, White, Light Gray, and Dark Gray. These standard colors have plotted line widths associated with them of 0.18, 0.25, 0.35, 0.35, 0.50, 0.70, 0.35, 0.25, and 0.18 respectfully. These numbers are shown in the Standard Color boxes on the color chart. The line weights specified are in millimeters, and are based on the Leroy pen widths, which have been used for decades as drafting line width standards. The line weights of all colors in this color scheme are based on the first nine (9) color line widths.

The six gray shades are chosen for shading purposes and are set to the percent shading of the number in each box, with a line width of 0.25.

The numbers inside each box from column 210 on, represent percent shading in increments of 2, from 2% shading to 80% shading, and 0.25 pen width. These colors (210 to 249) are to be used for special purposes only. They can be used for gradient fills, or areas where you need a shade between the 10% differential in shading.

Since the most used pen width used is 0.25, all colors ending in zero (0) are 0.25 pen width and 100% shading. These colors are mainly used for text labeling and notes, although they can be used for any purpose you will need a 0.25 pen at 100% shading.

Any particular color can be fully described by its number, up to color 210. Color 34 is 30% shading and the same pen weight as pen 4. Color 76 is 70% shading and the same pen weight as pen 6. All other pens from color 10 to color 210 follow this nomenclature.

Since there is no such thing as shading over 100% (100% is totally black), The scheme starts over at color 110. Color 53 and color 153 are identical. Color 82 and color 182 are identical, etc.

Colors in the 100 and 200 columns are 100% shading, following the method described above.

The only thing to really memorize is the first nine color line widths, arranged in a triangle beginning with 0.18, rising to 0.70 at color 6, and then returning to 0.18 at color 9. The shading percentage is fully described in the color number itself. Refer to the color chart on the next page.

An AutoCAD CTB file corresponding to these color and linewidth settings can be obtained from the Town of Paradise upon request.

Select Color ✕

Standard Colors
.18 .25 .35 .35 .50 .70 .35 . .18

Gray Shades (%)
40 35 30 25 20 15

Logical Colors
BYLAYER   BYBLOCK

Full Color Palette

8	18 38 58 78	0.25
6	14 34 54 74	0.70
4	10 30 50 70	0.35
2	6 26 46 66	0.18
0	2 22 42 62	0.25

10 20 30 40   50 60 70 80   90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240

1	4 24 44 64	0.18
3	8 28 48 68	0.35
5	12 32 52 72	0.50
7	16 36 56 76	0.35
9	20 40 60 80	0.18

Color: [ ] [ ]

OK   Cancel   Help

The first digit(s) of the color number represent the percent shading, while the last digit represents the pen weight associated with the corresponding pen weights of colors 1 through 9 above.

Color Number: XY, Where X is the shading and Y is the pen weight corresponding to the pen weight of the pen number above (pens 1 – 9)

Example: Color 87 is 80% Shading and is the same line weight as pen number 7. Color 63 is 60% Shading and is the same line weight as pen number 3.

Special Rules:

1. All colors ending in zero (0) up to pen #190 are pen wt 0.25 and are solid shading.
2. Shading starts over again at color 110. IE: Color 64 and 164 are equivalent, etc.
3. Pens beginning with 210 are in increments of 2% shading and are all 0.25 pen wt.

Neatness and Organization of Product

Points to consider:

- Drawings shall be neat and organized.
- As a general rule, layer 0 shall not be used for drafting.
- All entity colors and linetypes shall be "ByLayer" whenever possible.
- Duplicate information should be avoided whenever possible.
- Drawings should be purged of unused information.
- Efforts should be taken to minimize the drawing file size.
- Spell checkers should be used to minimize spelling errors.
- Lines should not be overshot or undershot, or be segmented unless necessary.
- Curves should be tangent to adjoining lines where appropriate.
- Elevations of lines and text should be noted and set to zero elevation as a general rule.
- Notes should be planned out, legible, and properly justified.
- Leaders should not cross.
- Plan and profile views should line up.

Organization of a Capital Project Services Project

The table below shows an example of how a Capital Project can be organized into several drawings for two main reasons, drawing speed and multiple team members working on the project at the same time. Splitting of the drawing files requires the use of Xref commands and Data Links. The filenames in parenthesis are suggested standardized names. The drawing name will consist of the 5-digit capital project number, followed by the letter designation describing the type of drawing it is, such as T for Topo, B for Base, P for Pipeworks, S for Striping, and L for Lighting.

All Capital project drawings which include a topo drawing and a base design drawing shall be split into 2 individual drawings with the topo (T) drawing x-refed into the base (B) drawing at a minimum.

Drawing	Xrefs and Data Links
Topo Drawing (50123T.dwg) 1. Points 2. Existing linework 3. Topo text 4. OG Surface feature lines 5. OG surface	• Datalink Alignments
Design Drawing (50123B.dwg) 1. Proposed 2D linework 2. Alignments 3. Profiles 4. Profile Views 5. Corridors 6. FG Surface 7. Cross Sections	• Xref Design, Topo, and Pipeworks Drawings • Datalink OG Surface
Pipeworks Drawing (Optional) (50123P.dwg) 1. Existing SD 2. Existing SS 3. Proposed SD 4. Proposed SS 5. Any pipes that need to show in profiles	• Xref Topo and Design Drawings • Datalink OG, FG (Corridor), alignments,profiles
Striping and Signage Plan (Optional) **(50123S.dwg)**	• Xref Design Drawing, topo, and pipeworks – multiple people working on project
Street Lighting and Electrical (Optional) (50123L.dwg)	• Xref Design Drawing, topo, and pipeworks– multiple people working on project

Notes regarding the different drawings

Topo Drawing

Since points cannot be data linked, the points must reside in the same drawing as the OG surface, along with all of the feature lines that will be used for the OG surface. To include existing line work and topo text in this same file does not encumber the efficiency of the drawing. Although preliminary alignment 2D line work may exist in the topo drawing, it may or may not be used for the final design alignment, therefore, it is unnecessary to create an actual alignment in the topo drawing. The alignment from the design drawing can be data linked into the topo drawing if the topo drawing needs an alignment.

Design Drawing

The design drawing will probably be the largest and most cumbersome drawing in the group due to the types of Civil 3D objects that must be part of this drawing. Since the corridor will be in this drawing, and it depends on the alignments, profiles, and assemblies, all of these objects must reside in this drawing.

The design sequencing may very likely require working with FG profiles, cross sections, and the corridor frequently, the profiles and profile views need to reside in this drawing.

Since a lot of the design work relates to the 2D line work, and this line work may change frequently throughout the design process, the 2D line work should reside in this drawing.

Save all of the labeling for the output drawings.

Pipeworks Drawing (Optional)

The pipeworks drawing can be a different drawing if pipeworks design has to be concurrent with roadway design. This will allow two designers to work on their perspective tasks at the same time

Striping and Signage Plan (Optional)

If multiple people need to work on a fast track project, it may be necessary to create a separate Striping and Signage Plan by Xrefing in the Topo, Design, and possibly the Pipeworks drawings. All striping and signage labeling, and notes and details should be in this drawing also. Usually, there are no Civil objects in these types of drawings except for notes, so the drawings never really get that big.

Street Lighting and Electrical Plan (Optional)

If multiple people need to work on a fast track project, it may be necessary to create a separate Street Lighting and Electrical Plan by Xrefing in the Topo, Design, and possibly the Pipeworks drawings. All striping and signage labeling, and notes and details should be in this drawing also. Usually, there are no Civil objects in these types of drawings except for notes, so the drawings never really get that big.